

Applicants note that the Examiner has withdrawn claim 20 from consideration without mentioning a Restriction Requirement or providing a basis for withdrawing claim 20 from consideration. However, Applicants have canceled claims 19 and 20 without prejudice.

Applicants have amended the specification to correct chemical formulae named therein. Applicants submit that the changes made herein do not introduce new matter.

Claims 1-19 stand rejected under 35 U.S.C. § 112, second paragraph. The Examiner states that the phrases "at a temperature that retains the member in a conformal layer" and "annealing the conformal layer at a temperature sufficient to convert the member to dispersed voids" in claims 1 and 19 render the claims indefinite. Applicants submit that these phrases are not indefinite, but are broad descriptions that cover a variety of compounds and processing conditions. As the Examiner notes, the temperature that retains a member in a conformal layer and a temperature sufficient to convert the member to dispersed voids can vary depending on process conditions. Furthermore, the examples in the application provide sufficient examples of deposition temperatures and annealing temperatures that can be used with certain compounds to support the broad descriptions in the claims. Applicants respectfully request withdrawal of the rejection of claims 1-18.

The Examiner states that claims 1-19 of this application conflict with claims 1-30 of U.S. Patent Application Serial No. 09/484,689. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicants submit that no claims have been allowed in U.S. Patent Application Serial No. 09/484,689, which is currently on appeal. Thus, Applicants submit that there is sufficient reason to retain the claims in the instant application. Applicants will re-address the issue of double patenting if allowable subject matter is found in U.S. Patent Application Serial No. 09/484,689.

Claims 1-19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Grill*, U.S. Patent No. 6,312,793. In view of *Grill*, Applicants have amended claim 1 to remove "tertiarybutyl." Applicants have rewritten claims 2 and 5 in independent form.

Thus, the scope of claims 2 and 5 has not been changed. Applicants have amended claim 16 to depend upon claim 1 and claims 10 and 11 to depend upon claim 2. Applicants submit that the changes made herein do not introduce new matter and are fully supported by the specification.

Applicants submit that *Grill* does not teach, show, or suggest a deposition process comprising introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber, introducing at least one oxidizable chemical comprising a member selected from the group consisting of tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber, reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the member in a conformal layer, and annealing the conformal layer at a temperature sufficient to convert the member to dispersed voids, as recited in amended claim 1. *Grill* does not list any compounds having these functional groups. *Grill's* broad disclosure of a second precursor gas mixture containing C and H atoms, and optionally O atoms, does not teach, show, or suggest an oxidizable chemical comprising a member selected from the group consisting of tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl. Applicants respectfully request withdrawal of the rejection of claim 1, and of claims 16 and 18, which depend thereon.

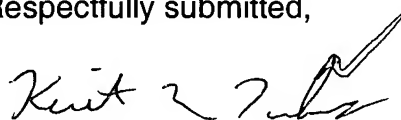
Applicants submit that *Grill* does not teach, show, or suggest a deposition process comprising introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber, introducing at least one oxidizable chemical comprising two or more members selected from the group consisting of tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber, reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the two or more members in a conformal layer, and annealing the conformal layer at a temperature sufficient to convert the two or more members to dispersed voids, as recited in claim 2. As discussed above, *Grill* does not describe an oxidizable chemical having a tertiarybutoxy, furfuryl, furfuryloxy, or neopentyl group. Furthermore, *Grill* does not describe an oxidizable chemical having two or more tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, or neopentyl groups.

Applicants respectfully request withdrawal of the rejection of claim 2, and of claims 3-4, 10-15, and 17, which depend thereon.

With respect to claim 5, *Grill* does not teach, show, or suggest a deposition process comprising introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber, introducing at least one oxidizable chemical comprising a member selected from the group consisting of tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber, wherein the at least one oxidizable chemical comprises silicon, reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the member in a conformal layer, and annealing the conformal layer at a temperature sufficient to convert the member to dispersed voids, as recited in claim 5. *Grill* generally describes precursors having silicon, carbon, oxygen, and hydrogen. However, *Grill* does not describe any silicon compounds comprising a tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, or neopentyl group. Applicants respectfully request withdrawal of the rejection of claim 5, and of claims 6-9, which depend thereon.

In conclusion, the reference cited by the Examiner does not teach, show, or suggest the method of the present invention. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please replace paragraph [0037] with the following paragraph:

[0037] The amount of labile organic groups retained in the deposited silicon/oxygen containing material can be increased by mixing the reactive compounds with non-silicon containing components that comprise one or more labile organic groups. The labile organic groups include the dioxan, furan, and fulvene derivative chemicals described for the silicon containing reactive compounds and other oxygen containing organic groups. The labile organic groups are preferably the silicon containing and non-silicon containing components incorporated in the same molecule, but with the methylsilyl or methylsiloxanyl groups replaced with vinyl groups, or with the methylsiloxanyl groups replaced with ester groups, or with the methylsiloxanyl groups replaced with other non-silicon containing organic groups, in addition to those chemicals without the methylsiloxanyl groups, such as 1,4-dioxin and furan. Preferred non-silicon containing multiply unsaturated cycloalkanes (having two or more carbon-carbon double bonds) include:

vinyl-1,4-dioxinyl ether	[CH ₂ =CH ₂ -O-(C ₄ H ₃ O ₂), cyclic] <u>CH₂=CH-O-(C₄H₃O₂), cyclic</u>
vinyl furyl ether	[CH ₂ =CH ₂ -O-(C ₄ H ₃ O), cyclic] <u>CH₂=CH-O-(C₄H₃O), cyclic</u>
vinyl-1,4-dioxin	[CH ₂ =CH ₂ -(C ₄ H ₃ O ₂), cyclic] <u>CH₂=CH-(C₄H₃O₂), cyclic</u>
vinyl furan	[CH ₂ =CH ₂ -O-(C ₄ H ₃ O), cyclic] <u>CH₂=CH-O-(C₄H₃O), cyclic</u>
methyl furoate	CH ₃ C(O)-O-(C ₄ H ₃ O), cyclic
furyl formate	(C ₄ H ₃ O)-COOH, cyclic
furyl acetate	(C ₄ H ₃ O)-CH ₂ COOH, cyclic

furaldehyde	$\text{CH(O)-(C}_4\text{H}_3\text{O)}$, cyclic
difuryl ketone	$(\text{C}_4\text{H}_3\text{O})_2\text{C(O)}$, cyclic
difuryl ether	$(\text{C}_4\text{H}_3\text{O})\text{-O-(C}_4\text{H}_3\text{O)}$, cyclic
difurfuryl ether	$[(\text{C}_4\text{H}_3\text{O})\text{C(O)-O-C(O)(C}_4\text{H}_3\text{O})]$, cyclic <u>$(\text{C}_4\text{H}_3\text{O})\text{-CH}_2\text{-O-CH}_2\text{-(C}_4\text{H}_3\text{O)}$, cyclic</u>
tertiarybutylfurfuryl ether	$(\text{CH}_3)_3\text{-C-O-CH}_2\text{-(C}_4\text{H}_3\text{O)}$, cyclic
neopentylfurfuryl ether	$(\text{CH}_3)_3\text{-CH}_2\text{-C-O-CH}_2\text{-(C}_4\text{H}_3\text{O)}$, cyclic
furan,	$\text{C}_4\text{H}_4\text{O}$, (cyclic)
1,4-dioxin,	$\text{C}_4\text{H}_4\text{O}_2$, (cyclic)

and fluorinated carbon derivatives thereof.

IN THE CLAIMS:

Please cancel claims 19 and 20 without prejudice and amend the claims as follows:

1. (Amended) A method for depositing a low dielectric constant film, comprising:
introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber;
introducing at least one oxidizable chemical comprising a member selected from the group consisting of [tertiarybutyl,] tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber;
reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the member in a conformal layer; and
annealing the conformal layer at a temperature sufficient to convert the member to dispersed voids.
2. (Amended) A [The] method [of claim 1,] for depositing a low dielectric constant film, comprising:
introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber;

introducing [wherein the] at least one oxidizable chemical [comprises] comprising two or more members selected from the group consisting of tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber;

reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the two or more members in a conformal layer; and

annealing the conformal layer at a temperature sufficient to convert the two or more members to dispersed voids.

5. (Amended) [The] A method [of claim 1,] for depositing a low dielectric constant film, comprising:

introducing a siloxane comprising two or more silicons and four or more methyl groups bonded to the silicons into a processing chamber;

introducing at least one oxidizable chemical comprising a member selected from the group consisting of tertiarybutyl, tertiarybutoxy, furfuryl, furfuryloxy, and neopentyl into the processing chamber, wherein the at least one oxidizable chemical comprises silicon;

reacting the siloxane and the at least one oxidizable chemical with an oxidizing gas at a temperature that retains the member in a conformal layer; and

annealing the conformal layer at a temperature sufficient to convert the member to dispersed voids.

10. (Amended) The method of claim [1] 2, wherein the at least one oxidizable chemical is 1,1-ditertiarybutylethylene.

11. (Amended) The method of claim [1] 2, wherein the siloxane is selected from the group consisting of 1,1,3,3-tetramethyldisiloxane, 1,3,5,7-tetramethylcyclotetrasiloxane, and octamethylcyclotetrasiloxane.

16. (Amended) The method of claim [11] 1, wherein the siloxane is selected from the group consisting of 1,1,3,3-tetramethyldisiloxane, 1,3,5,7-tetramethylcyclotetrasiloxane,

and octamethylcyclotetrasiloxane, and the at least one oxidizable chemical is dimethylfurfuryloxy silane.